STAR DISC

Double-sided Planisphere
for the Southern Hemisphere

Reference guide

- The movements of the night sky
- Objects visible with binoculars
- Positions of the Planets 2016-2020
- Student questions and exercises

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MOVEMENTS OF THE NIGHT SKY

The ***Star Disc*** shows the nightly movement of the starry sky, which is due to the Earth's rotation. Looking south, the stars appear to move clockwise around the point known as the *South Celestial Pole* (SCP), which is the point in the sky directly above the Earth's south pole.

The South Celestial Pole lies above the horizon at an angle equivalent to the observer's **latitude.** For the *Star Disc* this is set at 35º south, about the latitude of Adelaide, Sydney and Auckland, but accurate enough for much of Australia, NZ, and the southern parts of Africa and South America. Viewers closer to the equator will see the southern horizon slightly higher, while those at more southerly latitudes will see more sky between the SCP and the southern horizon.

The back of the *Star Disc* shows the sky looking north; here stars rise in the east, arc up until they are due north, then descend to set in the west, just as happens with the Sun and Moon. The *Celestial Equator* is the line 90º from the SCP, equivalent to the Earth's equator; it rises due east and sets due west.

Changes in the region of the sky visible at various times of the year are due to the Earth's orbit about the Sun, which causes the Sun to appear to move **eastwards** against the background stars. Consequently, if the sky is observed at the same time each night, the star patterns appear to move **westwards** at a rate of 1º per night, or 30º a month. The Sun's path through the stars is known as the *ecliptic* (shown as a yellow line); it is tilted from the Celestial Equator because of the 23½º tilt of the Earth's axis, giving rise to the Earth's seasons.

USING THE STAR DISC - Rotate the inner circle until the present date matches the current time (subtract an hour from your clock time if daylight saving is in effect). Use the main face when facing south, the crescent-shaped window when looking north. Hold the *Star Disc* vertically in front of you and use a flashlight (covered in red cellophane to protect night vision if you wish) to illuminate the disc. *See instructions on Star Disc for further details.*

OBJECTS visible with binoculars include open star **C**l**usters**, the more compact **Globular** clusters, **Nebulae** (gas clouds) and **Galaxies**. The *Star Disc* features the best 15 objects - they are listed below with their location **N**orth or **S**outh of the equator, the **month** they are highest at midnight and a checklist for recording sightings.

Object	Type	N/S	Best month	✓
Beehive (Praesepe) M44	Cluster	N	February	
Eta Carinae Nebula	Nebula	S	March	
Southern Pleiades	Cluster	S	March	
Omega Centauri	Globular	S	April	
Hercules Cluster M13	Globular	N	June	
Lagoon Nebula M8	Nebula	S	June	
M7 Ptolemy's Cluster	Cluster	S	June	
Small Magellanic Cloud	Galaxy	S	September	
47 Tucanae	Globular	S	September	
Andromeda Galaxy M31	Galaxy	N	October	
Hyades Cluster	Cluster	N	November	
Pleiades M45 (7 sisters)	Cluster	N	November	
Large Magellanic Cloud	Galaxy	S	December	
Orion Nebula M42	Nebula	S	December	
Tarantula Nebula	Nebula	S	December	

STUDENT QUESTIONS AND EXERCISES

1. Are there stars in our sky that **never set**? Which are the brightest of these? Can people in the northern hemisphere see these stars? Are there areas of the sky that we can't see, that only people in the north can see?

2. How would the planisphere be different for people **north** of the equator? Or for people at the equator? Or at the south or north pole?

3. How many of the **constellations** actually resemble the animals or objects they are meant to represent? How did they acquire their names?

4. Why do **stars** (but not planets) twinkle? Why do they have different colours?

5. From the locations given for the **Sun** (see over), place four small stickers on the northern card (by gently lifting the lower part of the cover) to represent the location of the Sun at the *solstices* (mid-summer and mid-winter) and *equinoxes* (Autumn and Spring). What can you notice about the differences in how the Sun moves on these days, where it rises and sets, and the length of the days at these times? What effect does this have on the seasons?

6. Create your own **mini-Planetarium** by placing stickers on the northern card to represent the position of the Sun, Moon and planets as they appear in the sky tonight. (Use the rise and set times from a newspaper or website to help place the stickers). Rotate the wheel to show how these bodies rise and set during the day and night. How accurately can you predict rise and set times?

7. Can the *Star Disc* be used as a **clock**? Go out and observe the *Southern Cross* and try to estimate the time by its appearance in the Southern Sky.